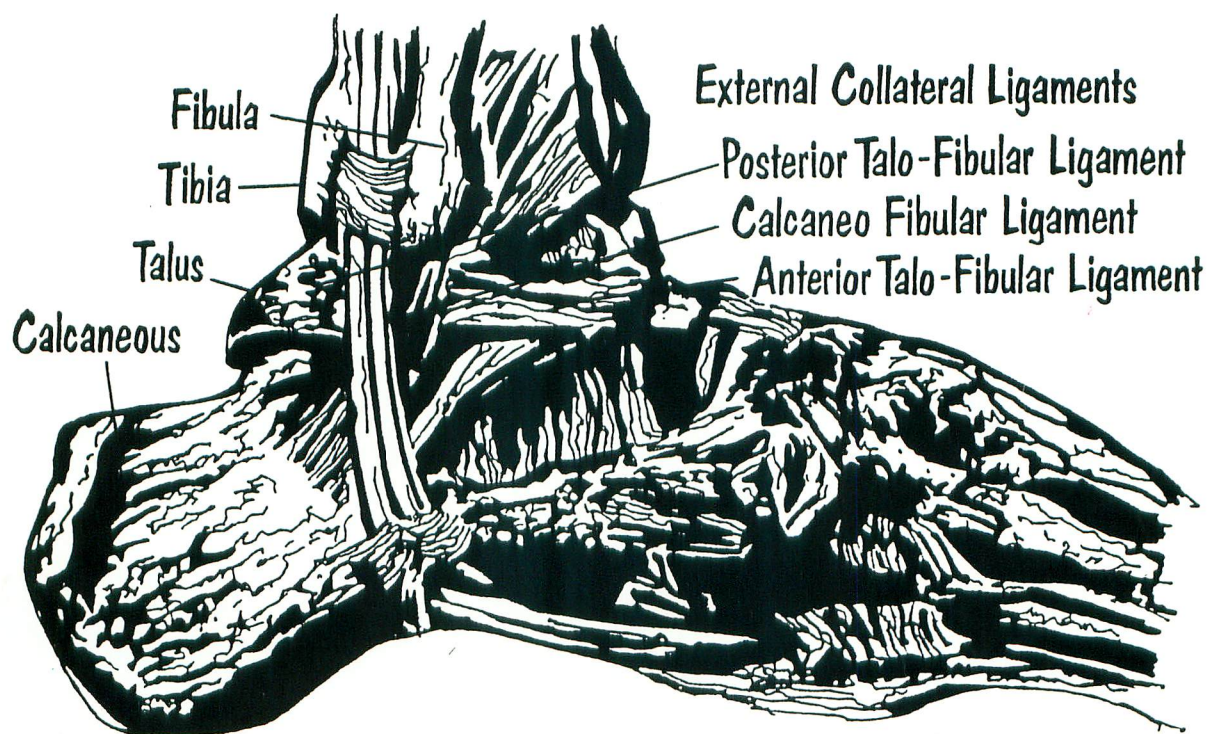


ORTHOPAEDIC

Physical Therapy

PRACTICE

Vol. 2, No. 4, 1990

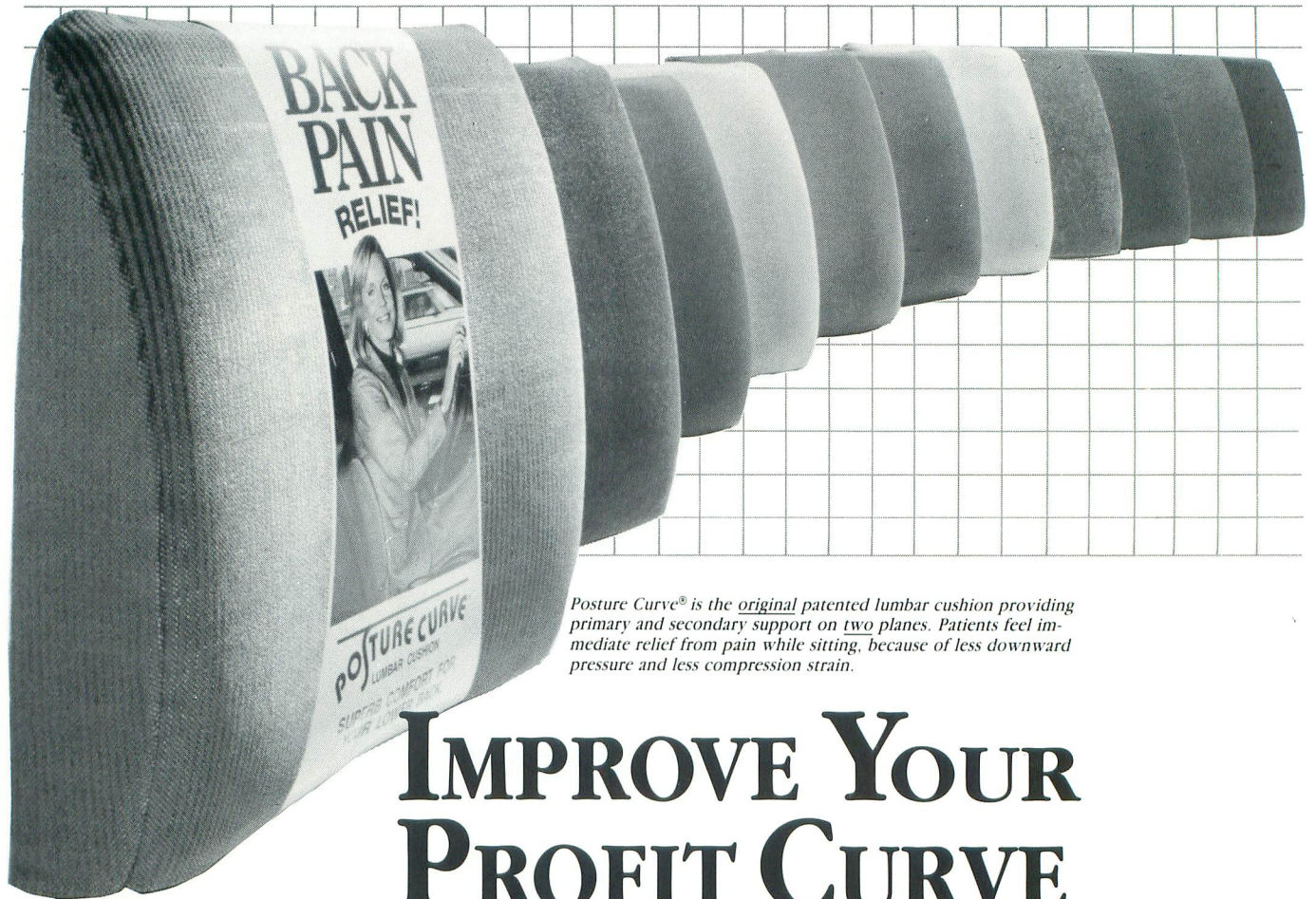


Lateral Ankle Sprain

AN OFFICIAL PUBLICATION OF THE
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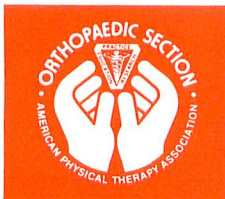
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ABOUT THE COVER

Ankle Sprains are one of the most frequently encountered orthopaedic injuries. In addition to the capsular-ligamentous injuries, grade III ankle sprains can result in medial joint compartment damage to the articular cartilage. Illustrations by Tracy Jensen.

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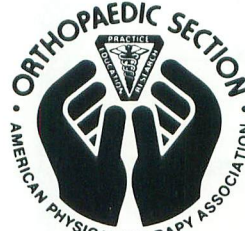
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Carolyn Wadsworth, P.T., M.S. 1983-1985
Robert H. Deusinger, P.T., Ph.D. 1985-1987

Publications Committee Chair Commentary

YOU, TOO, CAN BE A WORD ARTIST

My first goal, as newly appointed publications committee chair of *Orthopaedic Physical Therapy Practice*, was to review all of the previous issues of this publication. This was not a difficult task since, as many of you know, Orthopaedic Practice was founded only last year.

Physical therapists' demand for specialized information has contributed to the growth of this publication. Orthopaedic Practice has primarily provided the physical therapist with information regarding the Orthopaedic Section as well as review articles and case reports on clinical practice.

As I reflect back on two decades as a clinician, teacher and researcher, it is clear to me that the 80s witnessed more changes in our field than the preceding decade. For example, in the clinical area we have witnessed major changes in the organizational structure of health care settings, reimbursement patterns, personnel, specialization, information management, equipment, legislative issues, and

methods and techniques of assessing and treating patients.

What are the major ideas that are influencing, or will influence orthopaedic physical therapy in the nineties? I'm not sure I know. However, if this publication is to serve as a learning experience for us, we must at the outset establish a climate of mutual inquiry.

Speaking for myself, I envision my role as publication committee chair in two primary areas. The first is to provide a commentary on practice issues which I believe are pertinent to physical therapists. My second, and equally important role, is to help you publish your case studies, review articles and research reports. Consequently, we are expecting that you will submit your work for review by the publications committee. We will start watching the mailbag and fax machine hoping to find copy from you, the reader.

John M. Medeiros, P.T., Ph.D.

PRESIDENT'S MESSAGE

Jan K. Richardson, President

Summer has been a bustling time for the Orthopaedic Section. As most of you are aware, Dr. Gary Smidt was hired as the new Journal Editor in July. Most of Dr. Smidt's time has been spent in securing office space and setting up the new Journal headquarters in Iowa. Computers are now up and running and Gary and his staff are busy finalizing the January 1991 Issue of the JOSPT.

Additionally, on August 1, 1990, Christine Saudek the Managing Editor of JOSPT and Editor of Orthopaedic Physical Therapy Practice (OP) resigned to return to private practice. Chris has been the keystone of JOSPT and OP. Chris has served the publication component of the Orthopaedic and Sports Sections well. She has consistently performed at the highest level and offered an element of sincerity and concern. She is above reproach with regard to time management and meeting deadlines. Thank you, Chris, for all your efforts and may you have great success with your future activities.

Chris has been replaced as the Managing Editor by Debra Durham. Debra has come to us from the Publication/Editorial Services Units at the University of Iowa and will be working very closely with Dr. Smidt on the production of JOSPT. We welcome Debra to our journal staff and

encourage all of you to feel free to contact their office at (319) 335-8406 if you have any questions.

Lastly, we wish to welcome Sharon Klinski to our Section Office in La Crosse. Sharon was hired as the Managing Editor of Orthopaedic Practice and to assist Terri Pericak with other Section activities. We encourage all of you to contact Sharon or the office at any time.

We again welcome all of our people and look forward to a very productive fall and winter.



Jan K. Richardson, P.T., Ph.D., O.C.S.
President



SHORT TERM COURSES

INSTRUCTIONS FOR SHORT-TERM COURSE ADVERTISEMENTS

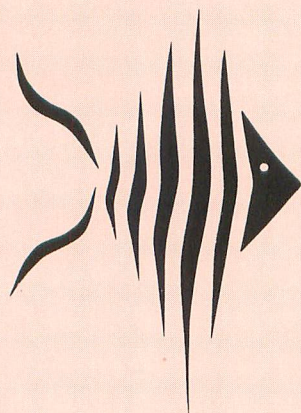
Advertisers are requested to include all necessary information for prospective course participants. The Orthopaedic Physical Therapy Practice is published 4 times per year-January, May, August, November. Ad deadlines are the first day of the preceding month. Rates are \$5.00 per line. Lines may be estimated on a 45 character per line basis (this includes letters, punctuation marks and spaces). The right to reject an ad or change wording is retained by the editor. Ads must be accompanied with payment. Send copy to: Orthopaedic Physical Therapy Practice, 505 King Street, Suite 103, La Crosse, WI 54601.

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January 3-5, 1991, Boston Area. Russell Woodman. For more information: Education Resources, Inc., 16 Park St., Suite 2, Medfield, MA 02052 (508) 359-6533

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March 22-24, 1991, Cincinnati, OH. Barrett Dorko. For more information: Education Resources, Inc. 16 Park St., Suite 2, Medfield, MA 02052 (508) 359-6533.



1991 Combined Sections Meeting

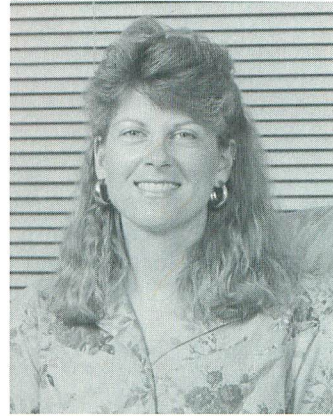
Orlando, Florida

January 31 - February 3

Your attendance is encouraged
for the Orthopaedic Section Business Meeting
on Saturday, February 2, 1991
from 9:00 - 11:00 A.M.

FROM THE SECTION OFFICE

Terri A. Pericak, Administrative Director



Summer is finally coming to an end and fall is in the air. As the seasons are changing so are a few things at the Section office. The Journal of Orthopaedic and Sports Physical Therapy officially moved from the Section office in La Crosse, Wisconsin, to the University of Iowa in Iowa City, Iowa. I am pleased to announce that the transition was a smooth one. Dr. Gary Smidt, the new Editor, has settled into his new role quickly and he and his new staff are busy at work putting together the first issues for 1991.

On August 15th, Sandy LaValley was hired as a part time secretary to assist the Administrative Director in the ongoing

day to day responsibilities of the Section office. Sandy has proven to be a great asset to the office and we all welcome her aboard.

The Finance Committee met in La Crosse, September 7th and 8th to work on setting the budget for 1991. A lot was accomplished during this meeting. One major outcome was producing a balanced budget to bring forth to the Executive Committee for approval during the Fall Meeting.

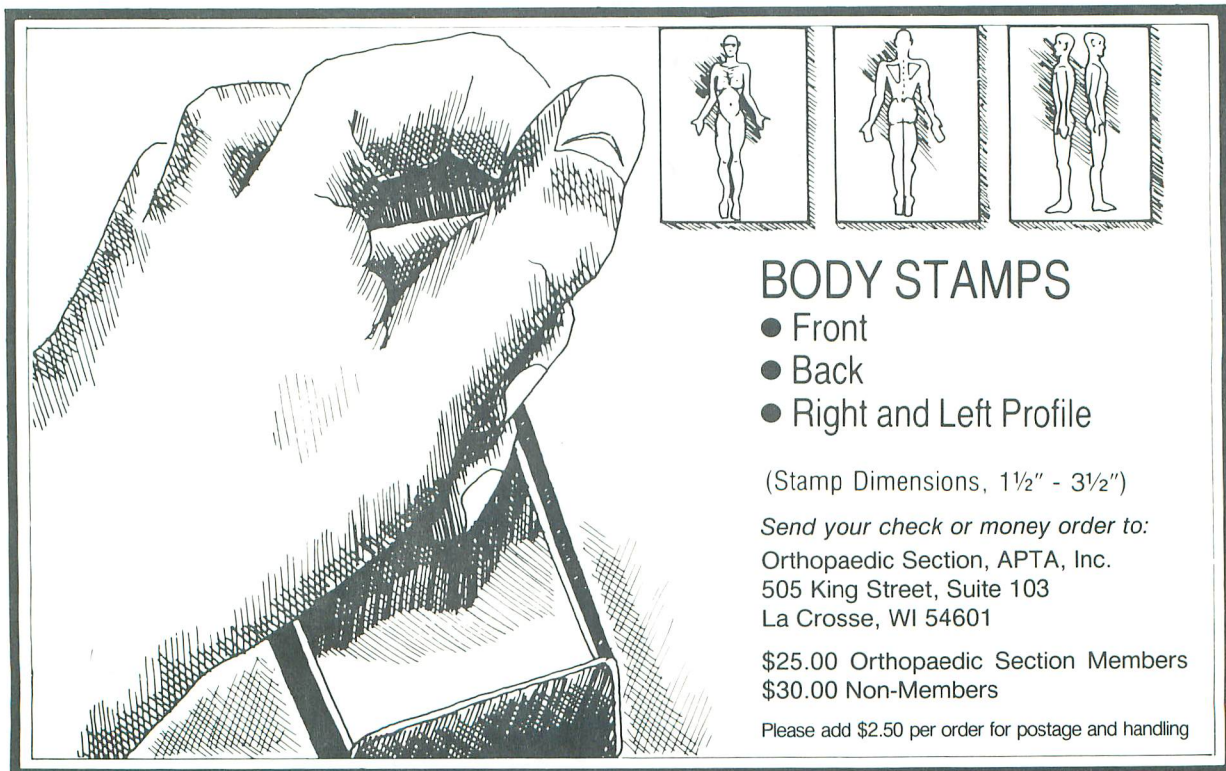
This year the Orthopaedic Section's Fall Meeting is going to be held in Pittsburgh, Pennsylvania, October 18-21. Two major agenda items include adopting a 1991 budget and having a future

planning session to determine the direction the Section should take in the years to come.

As a final note, I would like to encourage all of you to be thinking about nominees for the positions of Member-at-Large and Nominating Committee members for the Section's 1991 elections. Please submit any nominations you may have to the Section office. The final call for nominations will be conducted at the business meeting during CSM in Orlando.

Terri A. Pericak

Terri A. Pericak



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- Front
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- Right and Left Profile

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SIXTY-SIX PHYSICAL THERAPISTS RECEIVE SPECIALIST CERTIFICATION

Alexandria, VA August 6, 1990

The American Board of Physical Therapy Specialties (ABPTS) announces its certification of 66 physical therapists as clinical specialists.

The ABPTS, an appointed group of the American Physical Therapy Association (APTA), oversees the physical therapy clinical specialist certification program and awards certificates to physical therapists meeting approved requirements.

To receive certification, candidates were required to successfully complete an examination and demonstrate specialized knowledge and advanced clinical proficiency in an area of physical therapy practice.

The program began in 1985 with ABPTS awarding certificates to three specialists. To date, the board has recognized a total of 197 certified clinical specialists.

The American Physical Therapy Association endorsed the concept of specialization in 1978 to identify and define physical therapy specialty areas

and to formally recognize physical therapists who attain advanced knowledge and clinical skills in those areas.

The six areas involved in the specialization process are cardiopulmonary physical therapy, clinical electrophysiologic physical therapy, neurologic physical therapy, orthopaedic physical therapy, pediatric physical therapy, and sports physical therapy.

In the area of Orthopaedic Physical Therapy, 35 physical therapists were certified:

1990

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Irene M. Barlow-Rademeyer, PT, OCS
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Gloria T. Sigafos, PT, OCS
LTC Mary Ann Sweeney, MS, PT, OCS
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Kenneth J. Trzecki, PT, OCS
Michael D. Wah, PT, OCS
Catherine M. Walls, MS, PT, OCS
Meg Wheadon-Taylor, PT, OCS
Michael J. Wooden, MS, PT, OCS

CALL FOR NOMINATIONS FOR NATIONAL APTA OFFICES

We need your help in securing nominations for National APTA office. The offices that need to be filled are:

- 1) President
- 2) Vice President
- 3) Member-Nominating Committee
- 4) Executive Board Member (3 Members)

-AND-

CALL FOR NOMINATIONS FOR ORTHOPAEDIC SECTION OFFICES

We also need your help in securing nominations for our Orthopaedic Section offices. The offices that need to be filled for this next year are:

- 1) Member-at-Large
- 2) Nominating Committee Member

We do accept self-nominations. If you have questions regarding the roles and responsibilities of the two (2) offices, please contact me. Please send nominations and recommendations for both offices to:

Dr. Scott M. Hasson, Chair, Nominating Committee
School of Physical Therapy
Texas Woman's University
1130 M.D. Anderson Blvd.
Houston, TX 77030
(713) 794-2076



Distinguished Service Lecture Award

A motion was passed at the Executive Committee meeting at Annual Conference to approve the Distinguished Service Lecture Award, an Orthopaedic Section Award. Please submit any nominations to the Section office by December 1, 1990.

PURPOSE

1. To acknowledge and honor a most outstanding Orthopaedic Section member whose contributions to the Section are of exceptional and enduring value.
2. To provide an opportunity for the recipient to share his or her achievements and ideas with the membership through a lecture presented at an APTA Combined Sections Meeting.

ELIGIBILITY

1. The nominee must be a member of the Orthopaedic Section, APTA, Inc. who has made a distinguished contribution to the Section.
2. Members of the Executive Committee and members of the Awards Committee shall not be eligible for the award during their term of office.

CRITERIA FOR SELECTION

1. The nominee shall have made substantial contributions to the Section in one or more of the following areas:
 - a. Demonstrated prominent leadership in advancing the interests and objectives of the Section.
 - b. Utilized exceptional ability and influence to promote the science, education, and practice of orthopaedic physical therapy.
 - c. Obtained professional recognition and respect for the Section's achievements.
 - d. Advanced public awareness of orthopaedic physical therapy.
 - e. Served as an accomplished role model, and provided incentive for other members to reach their highest potential.
 - f. Utilized notable talents in writing, teaching, research, administration, and/or clinical practice to assist the Section and its membership in achieving their goals.
2. The nominee shall possess the ability to present a keynote lecture, as evidenced by:
 - a. Acknowledged skills in the organization and presentation of written and oral communications of substantial length.

- b. Sufficient background, knowledge, and experience from which to draw lecture material.

PROCEDURE FOR NOMINATION

1. Any member of the Orthopaedic Section may nominate candidates for the award.
2. One original set and four duplicates of all materials submitted for each nomination must be received by the Administration Director at the Section office by December 1, for consideration for the award in the following year.
3. The materials submitted for each nomination shall include the following:
 - a. A support statement from the nominator, indicating reasons for the nomination, and clarifying the relationship between the nominator and nominee.
 - b. Support statements from a minimum of 5 professional colleagues.
 - c. Support statements from a minimum of 5 individuals who are not physical therapists, but have been involved with the Section through association with the nominee.
 - d. Support statement from a minimum of 5 Orthopaedic Section former or current officers or committee chairs.
 - e. The nominee's curriculum vitae.
4. The nomination materials should document examples of how the nominee fulfills the criteria for this award.

PROCEDURE FOR REVIEW AND SELECTION

1. Nomination materials shall be submitted to the Awards Committee Chair and members by the Section office. The Section office will retain the original set of materials.
2. The Awards Committee will review the nominations and recommend the most qualified candidate to the Executive Committee.
3. The Executive Committee will select the recipient.
4. Any member of the Awards or Executive Committees, who is closely associated with the nominee, will abstain from participating in the review and selection process.
5. The award will be presented only if there are qualified candidates, and one is selected.
6. Nomination materials are considered the property of the Awards Committee, who will maintain their confidentiality.

7. Nomination materials will not be returned. If any individual is not selected for the award in a given year, that individual may be nominated in subsequent years.

LECTURE

1. The recipient will present his lecture at a Section "Awards Session" at the APTA Combined Sections Meeting. The lecture should not last longer than thirty minutes.
2. The title of the lecture will be left to the discretion of the recipient.
3. The lecture should focus on the recipient's ideas and contributions to the Section and orthopaedic physical therapy.
4. The recipient will be invited to submit a written copy of the lecture for publication in the Section's official publication *Orthopaedic Physical Therapy Practice*.

NOTIFICATION OF THE AWARD

1. The President of the Section will notify the recipient by April 1st and obtain written confirmation of acceptance from him, by May 1st.
2. The name of the recipient will be kept confidential until announced at the APTA annual meeting following the selection, approximately 8 months before he is to present the lecture.
3. The award will be presented at the APTA Combined Sections Meeting following presentation of the lecture.
4. Those nominees not selected will be so informed in writing.
5. The nominators of individuals not selected will receive a letter thanking them for their participation and informing them of the award recipient.

THE AWARD AND ITS PRESENTATION

1. The Orthopaedic Section will reimburse the recipient for round trip coach airfare from any site in the U.S. or Canada to the Combined Sections Meeting at which the lecture is presented, two days per diem consistent with the Section's current reimbursement rates and one day's conference registration.
2. On the occasion of the presentation of the lecture, the awardee will receive an appropriate plaque and an honorarium of \$250.
3. The recipient's name and date of award will also be inscribed on a Distinguished Service Lecture Award plaque that is retained and displayed in the Section's headquarters.

Cartilage Damage of the Ankle Joint Following Supination Trauma

Authors: Schultz W., Stinus H.
From the Orthopaedic Clinic of Gottingen University
(Director: Prof. Dr. Med. H.G. Willert)

Address: Dr. Wolfgang Schultz, MD
Assistant Medical Director, Orthopaedic Clinic
Robert Koch Strasse 40
D-3400 Gottingen, Federal Republic of Germany

Abstract

Arthroscopic investigation of the grade III lateral ankle sprain, carried out before ligament suture, demonstrated that the articular cartilage of the tibia and talus was injured in the medial joint compartment. This diagnosis provides an explanation for the long lasting post traumatic discomfort which is often observed in the medial region of the ankle joint of the patient following a severe supination injury. We recommend that in the presence of articular cartilage damage, non weight bearing should be maintained for two to eight weeks depending on the severity of the injury.

Introduction

Among the sports that require movement of players across a court or field, ankle sprains are one of the most frequently encountered injuries.¹ Methods of treatment for grades II and III sprains are numerous and are the subject of much discussion. Whether a nonoperative or operative treatment is recommended for a Grade III sprain is the subject of some controversy. The number of physicians who advocate a nonoperative initial treatment is about equal to those who choose an operative approach.^{2-10-13, 17}

In our opinion, if the symptoms and signs confirm a grade III, acutely injured ankle, surgery is recommended. However, independent of the method of treatment (non-operative or operative), post-clinical care appears to be of utmost importance in healing the injury to the joint. For example, lesions of the cartilage, which cannot be seen by standard roentgenograms, are not immediately treated. This sometimes leads, in spite of a clinically healed ligament, to long lasting discomfort when weight is born by the

joint and this proves to be very difficult to treat.

Interestingly, pain is localized in the medial ankle joint compartment, whereas, the injured side, the lateral compartment, shows no clinical irregularities. Because of these observations, we performed arthroscopic examinations on a number of patients with acute ligamentous ankle injuries which were to be treated operatively.

MECHANICS, BIOMECHANICS AND PATHOMECHANICS OF THE TALOCRURAL JOINT.

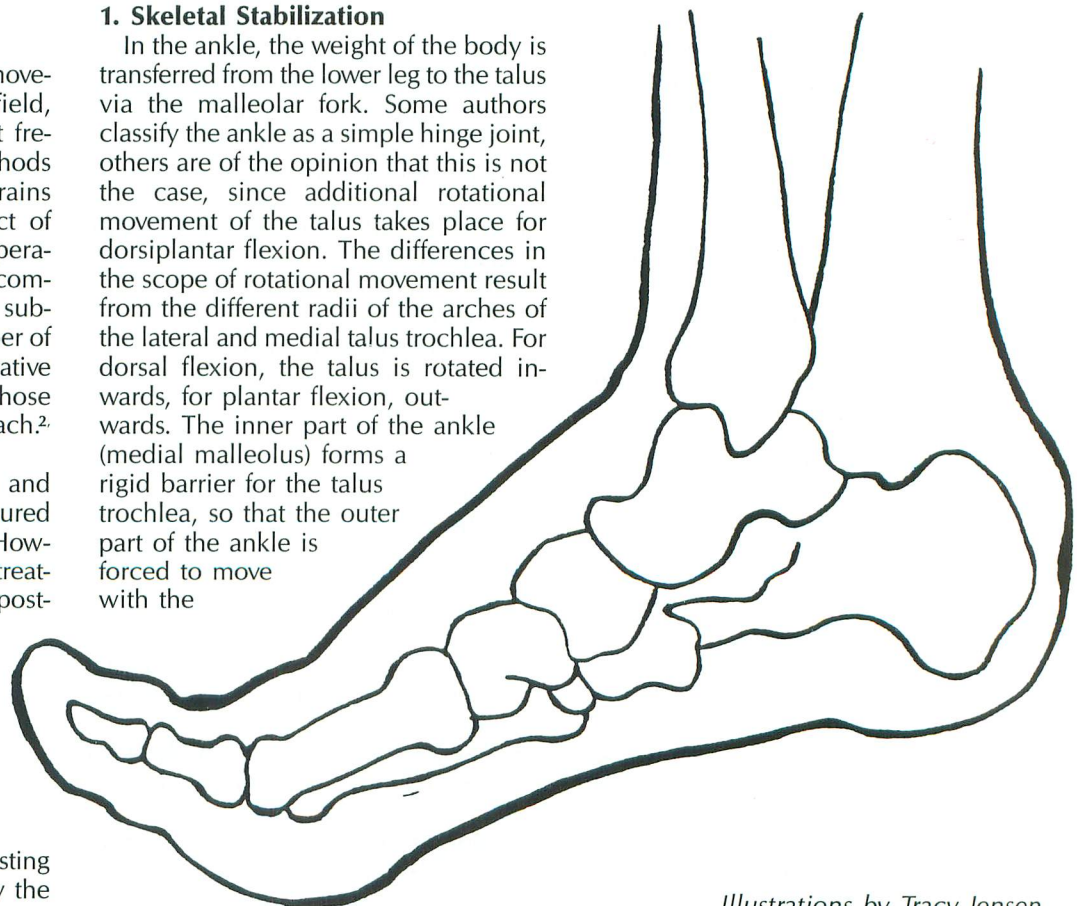
1. Skeletal Stabilization

In the ankle, the weight of the body is transferred from the lower leg to the talus via the malleolar fork. Some authors classify the ankle as a simple hinge joint, others are of the opinion that this is not the case, since additional rotational movement of the talus takes place for dorsiplantar flexion. The differences in the scope of rotational movement result from the different radii of the arches of the lateral and medial talus trochlea. For dorsal flexion, the talus is rotated inwards, for plantar flexion, outwards. The inner part of the ankle (medial malleolus) forms a rigid barrier for the talus trochlea, so that the outer part of the ankle is forced to move with the

rotational movement of the talus and the trochlea is thus held rigid during flexion of the talocrural joint. In plantar flexion, there is a certain amount of play because in this position, as, for example, on landing from a jump, the rear narrow part of the trochlea rests in the malleolar fork. In combination with the subtalar joint, more complicated movements are possible, for example, plantar flexion, adduction and supination.^{16,19}

2. Ligament Control

The talus is stabilized by a refined system of ligaments. Those ligaments



Illustrations by Tracy Jensen

which are frequently affected by injury to the lateral side of the ankle are the anterior talofibular and calcaneofibular ligaments.^{1,6} Most authors are in agreement that an increased tension in the lateral ligaments is caused by increased plantar and dorsal movement of the foot whereby the tension is greater for dorsal extension. In the neutral resting position, all lateral ligaments are more or less relaxed.¹⁹ However, a moderate functional treatment of the injured ligaments is still possible to achieve sufficient scar tissue and to preserve tension stimuli in the tissue. A tolerable range of 20/0/10 (plantar/dorsal movement) is considered to be acceptable neglecting pronation and supination components.¹⁴ The mechanism which caused ankle injury is seen as a combined forced movement of the foot in the sense of a forced supination, adduction and plantar flexion.⁴

3. Talocrural joint and cartilage injury

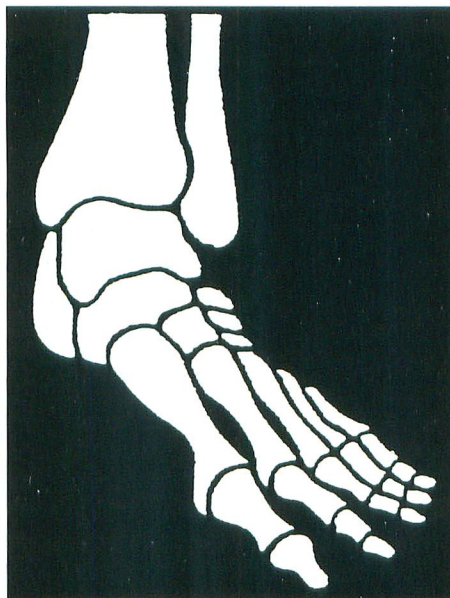
During weight bearing, additional forces and movement such as shearing, rotation and twisting in valgus occur in the talocrural joint. When standing on the toes, a stress of three times body weight is produced in the talocrural joint.¹⁹ The axial pressure in this movement is transferred directly to the surface of the distal tibiotalar joint. The fibular talar surface if relieved of additional pressure by external rotation of the leg.

Other authors also refer to cartilage injury to the talus, following distortion of the capsule which results in capsule ligamentous lesions.^{3, 17, 18} For lesions of the capsular ligaments, where there is no damage to the bones, chipped cartilage is almost never seen from the X-ray, because chondral and subchondral lesions cannot be demonstrated with any certainty by conventional methods. In addition, in acute injury, cartilage lesions are usually masked by the symptoms of the lesion of the ligamentous tissue.⁴ Segesser¹⁴ also points out that cartilage injuries of the talus are often primarily overlooked.

The mechanism of injury for dislocation of the medial talus is thought to be an impact force sustained during plantar flexion. A similar mechanism was already assumed by Berndt and Hardy¹ in the case of a trauma-dependent osteochondrosis dissecans of the medial talus.

Material and Methods

Fifteen patients with acute, grade III sprains of the lateral ligaments of the ankle were subjected to arthroscopy



before operative reconstruction of the ligament. The age range of the patients was from 18 to 40 years of age. Eight patients were male and seven were female. Seven patients had injured the left ankle and eight had right grade III ankle sprains.

For all patients, this was the first diagnosed severe ankle sprain. The diagnosis was made by comparing A-P and lateral X-rays of the injured ankle to the uninjured side. Surgery was recommended if there was a displacement of the position of the talus of more than 10 mm in any direction compared with the uninjured side. The range of displacement of the talus was from 10 to 18 mm for all patients investigated (Table 1).

Surgery confirmed the clinical diagnosis for all patients, that is, injury to the capsular ligament with rupture of the anterior talofibular and calcaneofibular ligaments.

Since plain X-rays of each ankle joint from both AP and lateral views did not reveal any cartilage damage, arthroscopic examination was carried out on each patients' injured ankle. The talocrural joint was accessed anteriorly and antero-medially after filling the joint with 15 ml of Ringers solution. In the lateral parts of the joints, no cartilage damage was found. However, in the medial compartment of the talocrural joint we found cartilage damage of the talus or tibia or both cartilage surfaces forming the joint (Table 2).

Plain X-rays of each injured ankle joint from both AP and lateral views showed normal results, typical for the age group of the patients without any indication of involvement of the joint surfaces. Figures 1-8 compare the preoperative X-ray results with arthroscopic confirmation of the cartilage damage.

Discussion and Conclusions

The treatment of acute, grade III ankle sprains has been debated for years.^{9, 11, 12, 17} Satisfactory results of treatment, that is, restored stabilization of the ankle have been reported by those who advocate an initial non-operative approach to treatment. However, some physicians espouse immediate surgery for the acutely injured ankle.

For the diagnosis of ankle injuries, the main emphasis has been placed on the

TABLE 1. X-ray angle and distance of tali displacement in mm

	Direction of X-rays	
	AP	Lateral
Lowest Value	10.0	10.0
Highest Value	18.0	14.0
Mean Value	13.5	11.7

TABLE 2. Severity, location, and average numbers of patients with tibia, talus or combined tibia-talus cartilage damage

Cartilage Damage	Localization		
	Tibia	Talus	Both
First Degree	4	0	1
First/Second Degree	0	0	1
Second Degree	2	0	5
Third Degree	2	0	0

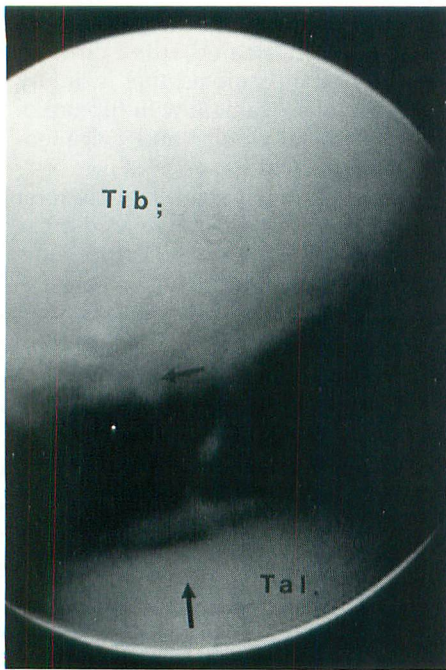


Fig. 1. Clearly recognizable damage of the Tibia and Talus.



Fig. 2. X-ray AP no apparent damage.

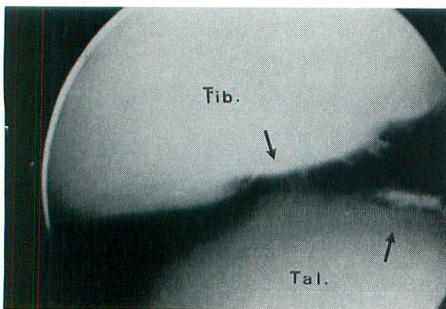


Fig. 3. Cartilage damage of the ventral tibia surface of the joint and cartilage defect of the Talus.

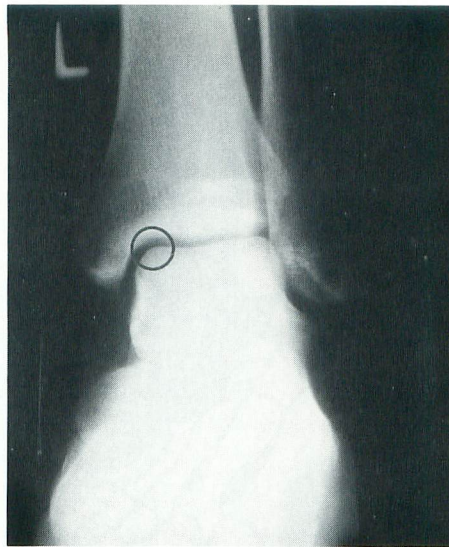


Fig. 4. AP X-ray showing no pathological result.

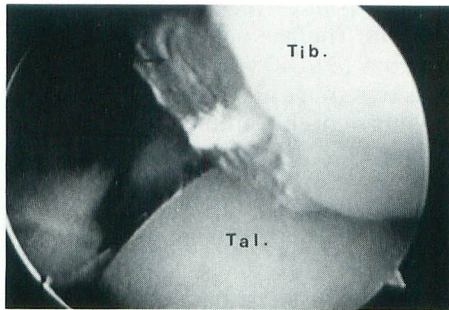


Fig. 5. So-called "flake fracture" of the medial edge of the Tibia.



Fig. 6. In the AP X-ray image the "flake fracture" is not recognizable.

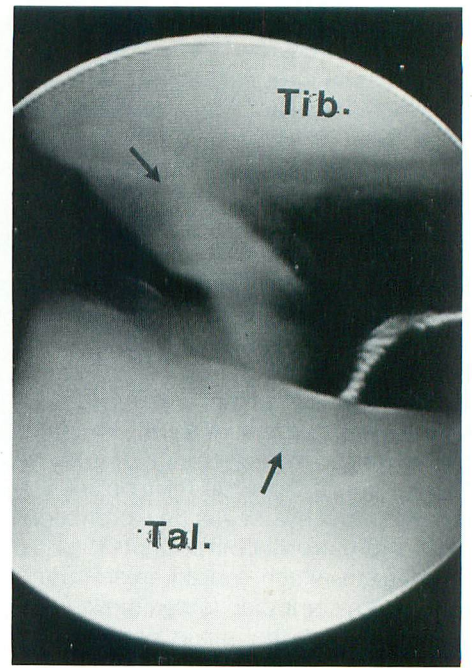


Fig. 7. Onset of osteochondrosis dissecans of the Talus. (The hook is seen at the site of the defect.)

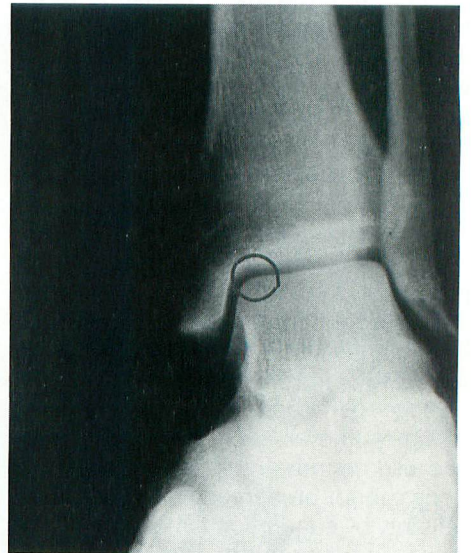


Fig. 8. Corresponding AP radiograph, defect not recognizable.

capsular-ligamentous system. Frequently, chipping or cystic alterations, mainly in the region of the medial edge of the articular cartilage of the talus, are discovered much later. In light of our results, we recommend the early assessment of the articular cartilage of the talocrural joint.

The mechanism of injury to the lateral cartilage of the talocrural joint is assumed to be an impact-rotation trauma in a dorsal over extension of the foot. Injury to the medial cartilage is usually caused by an over extension of the foot in plantar flexion.

More often than not, for injuries involving plantar flexion, cartilage damage of the talus is reported to be localized to the superior medial edge of the dorsal part of the talus.¹ This type of injury has been observed to occur in basketball players who often land on the toes with the foot slightly inverted.⁸

For seven of the fifteen patients we examined, the observed cartilage damage was a combined tibia and talus injury of varying severity. The remaining eight patients had changes in the cartilage in the ventromedial region of the tibia.

Without exaggerating the importance of the observed cartilage damage, we believe it prudent to consider a nonweight bearing rehabilitation program for at least two to eight weeks after injury depending on the severity of the cartilage damage. Ankle taping and stabilization shoes are applied once weight bearing is allowed.¹⁵ We do not advocate arthroscopic examination for every acutely injured ankle since an operative reconstruction is made much more difficult because of the water in the joint and the accompanying swelling of the tissue or the injured stumps of the ligament.

The most important aspect of the acute lateral ankle sprain appears to be that the medial joint compartment cartilage is affected in different ways in supination trauma. In cases of recurrence of the supination trauma, a posttraumatic arthrosis can occur in the region of the medial talus and the tibia (Figure 9).



Fig. 9. Severe arthrosis with exposure of the subchondral layer (arrow) in a case of severe chronic of ankle instability.

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There is no magic answer... But there are effective methods

By Susan J. Isernhagen, P.T., Isernhagen & Associates, Inc., 2202 Water Street, Duluth, MN 55812

To understand where we are today in the injury prevention realm we must go back to yesterday. What methods have we used to prevent injury? The answer in many cases is "nothing" or "nothing effective." In other cases, professionals have worked diligently to reduce injury for workers. This mixed level of intervention exists because up to now, there has been questionable funding. In most instances:

- worker's compensation systems DO NOT PAY for prevention
- insurance companies DO NOT PAY for prevention
- the government DOES NOT FUND business for prevention programs

and the question remains—WHO WILL PAY? The answer is complicated:

- the worker PAYS with bodily injury
- the employers PAYS with high cost and low productivity
- the state worker's compensation systems PAY with the heavy burden of monitoring its state resources

Who do they pay?

- they PAY health care professionals
- they PAY lawyers
- they PAY insurance companies
- and they PAY the worker money as a substitute for health

WHAT'S WRONG WITH THAT PICTURE? It seems as if everybody pays in the end, but few are paying in the beginning. Care after injury has been well funded but prevention of injuries has not.

TIMES ARE CHANGING! In the last months and years there has been a sharp rise in the interest of industry to fund prevention programs. While one wonders why government and private agencies are not more involved, it is to everyone's advantage that industry is taking this proactive stand. A healthier work force produces not only monetary cost benefits, but also intangible positives such as increased employee morale, improved employer-employee relationships and a healthier work force. In addition

to decreased costs of worker's compensation and health care, the other tangible benefit is increased productivity.

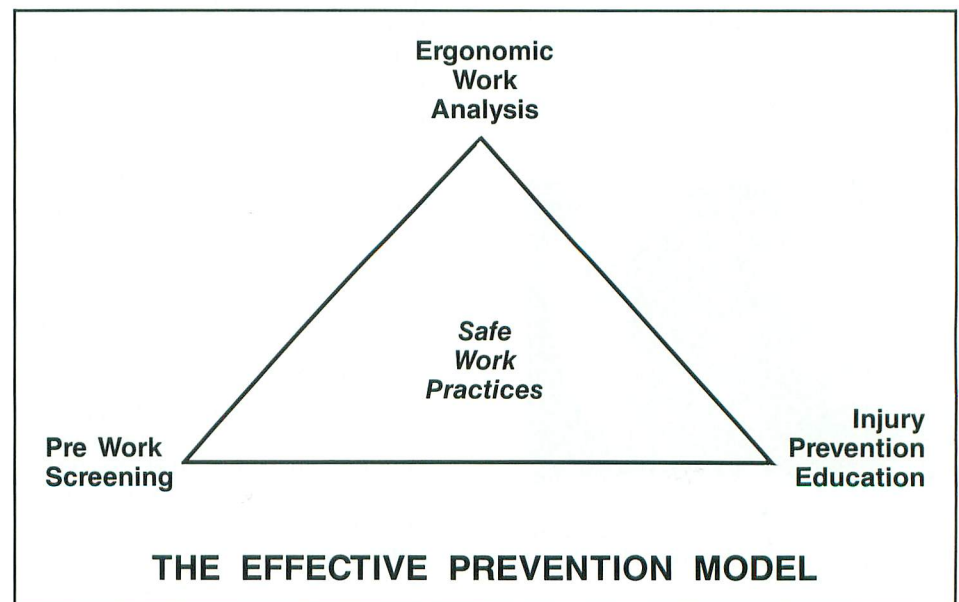
We begin, then, with accolades for industry's direction. Now let us investigate the methods used. Are the prevention concepts sound, and will the dollars and time invested prove helpful?

THE PREVENTION TRIAD Three types of programs have been found to be helpful in reducing injury. However, when implemented alone, each portion of the injury prevention program cannot make a major impact. While back schools have been utilized over the years, varying studies show that their effectiveness runs anywhere from non-effective to highly effective—when repeated regularly. Regarding ergonomic analysis, there has been an increase of productivity and decrease of injury when proper changes have been made. However, some ergonomic changes put stresses in other areas and can be counter-productive if not implemented judiciously. Thirdly, pre work screening has become a hot topic. It is based on the premise that if we hire people who will not get injured our injury rate will be reduced. The only problem in this scenario is that, all things considered, we do not know exactly who will be injured or who will get sick. Due to lack of

thorough research studies in all three areas, and due to lack of scientific evidence, we are not able to fully determine that any one of the three is as effective as it might be.

The design of the model shown below indicates how all three aspects must work together. Perhaps one of the reasons that we are searching for new prevention methods (such as a recent switch in emphasis from back schools to pre employment screening) is that we have not fully integrated our options. If one looks at the interrelationship between the three factors, we can see that they are not only related, but inescapably intertwined. If the work site is designed poorly, hiring fit people will not help. If physically capable people are hired, but choose to use unsafe work methods, their safety cannot be assured—and education in the face of work that is too physically difficult will not help. Also notice that the triangle indicates that safe work practices must be at the center of all three components of injury prevention.

To explore the role of the three components, let us take a look at an analysis of a typical injury problem. In looking at the methods for dealing with this problem, we can see that the solution is a combination of the three with safety as the core issue.



PROBLEM-SOLVING EXAMPLE— Nursing personnel with back injuries

The hospital and nursing home industries have seen a dramatic increase in worker's compensation rates. This has spurred them to look toward managing their injuries more effectively from the inside. Of critical concern is the high rate of back injuries with nursing personnel. To understand how to deal with this problem, hospital administrators have and are currently promoting:

- a. back injury prevention programs and/or
- b. screening of nursing personnel

Many hospitals still try only one form of prevention, which may be either education or screening. However, the problem is much more complex than the simplified approach of either education or screening. Let us take the example of back injuries suffered during lifting by nursing personnel.

The first question is: "Why do nursing personnel suffer back injuries?" An early response by administrators may point to sloppy techniques by personnel, or the lack of strong-enough nurses on the floor. Yet, in analyzing the problem, we find that it is much deeper:

1. The question can be asked, "If a 160 pound person were to be lifted by nursing personnel, how many personnel would be used?" The answer in our informal survey has been "2".
2. Then, dividing the weight of the person lifted into two equal parts we find that each lifter must lift and handle 80 pounds.
3. Because we know that bodies cannot always be divided exactly, it is more likely to suppose that a minimum, these workers are required to lift 100 pounds.
4. Other factors superimposed upon this lifting job are the following: a. The lifting is dynamic, often with bending and twisting involved. b. The load is not necessarily symmetrical or at rest. c. 100 pounds exceeds the maximal permissible limit for women and for many men. d. The lift is not performed once, but repetitively throughout a shift. e. Most of the personnel doing the work are women. f. Many of the personnel involved are also untrained, fatigued, and/or not at a high fitness level.

Therefore, when one analyzes the problem, it is easy to see it is complex. It has not been solved yet, but let us now look at the triad for a beginning of a solution.

REGARDING ERGONOMIC ANALYSIS: To evaluate the relationship between the worker and the task, analysis should include heights of wheelchairs and beds, type and weights of patients requiring manual, repetitive and static work, etc. In the mini-example we will look at lifting.

We need to know where weight is lifted from and to (in the case of a wheelchair to a bed transfer, the lift might occur between 18 inches and 32 inches). We need to know how much weight is lifted. Ergonomic analysis would also require knowing the frequency of the activity. In addition, the work site and the type of work load need to be assessed. For example, can a two-handed grip be used? Is the load stationary? How many repetitions per hour are required? etc. . . .

After the ergonomic analysis is done, it is quite clear that nursing personnel are involved in heavy to very heavy work (as classified by the Dictionary of Occupational Titles). People may be hired into nursing personnel jobs without regard for these extremely heavy demands placed on their bodies. Traditionally women of any age are hired for most of the nursing personnel jobs.

HOW TO SCREEN: There is the underlying idea that nursing personnel may not be physically able to do the heavy work, and yet, when pre work screening has been implemented, many times flexibility and the ability to do situps have been the prime area of emphasis. If pre work screening is functional and related to the actual job, flexibility and range of motion will be a small part. The most effective way to know whether a patient transfer can be done safely is to actually test the critical demand of lifting people. A box, or a machine, cannot truly substitute for the variability of a human body in transfer testing. An anatomical dummy may be used instead of a live person, but if the point is to make the test functional, actual transfers should be done.

Other screening should be designed to test additional critical demands of the job perhaps involving balance, walking, stopping, etc. It is now clear that the screening should be based on the results of the ergonomic analysis.

HOW TO EDUCATE: For nurses, the functional components of manual materials handling must be addressed. It is very important that the information gained through the education program be pertinent to nursing. Knowing how to lift boxes or how to push a wheelbarrow

will not have nearly as much meaning to a nurse as lifting techniques, sitting postures during charting, and knowledge of safe work practices. Therefore, education, while it can be general in concept, needs to eventually lead into the specifics of the type of work that will be done in the hospital by the nursing personnel. Both didactic learning and practice make the best combination.

ARE ERGONOMICS, SCREENING, AND EDUCATION ENOUGH? Can the hospital administration answer the following questions?

1. Are unsafe body mechanics, such as bent and twisted backs used by some or all employees?
2. Has management determined what is a safe limit for their employees to lift? Is it 50 pounds, 60 pounds, 90 pounds or 100 pounds? (If workers in an industrial site were lifting 100 pounds, there should be administrative controls brought in to reduce the amount of poundage used for that job.)
3. When should a hoist lift be used?
4. How many people should lift a 160 pound patient?
5. How many times during the day should the personnel be required to lift? How is the lifting done—from where to where? Could this distance be changed?
6. When do the injuries occur—at the sixth hour of an eight hour shift? What are longer shifts having to do with a change in injury rate?

These questions make it clear that before we buy new hospital beds, before we hire only brawny people and before we enroll our traditional back school, we must make a group of critical decisions:

What is safe for our workforce (and our patients)?

What are the alternatives to heavy lifting?

Do we have standards for techniques of patient handling?

Are these safe techniques written into policies and procedures?

Do we follow these safe procedures to the letter?

Do we continually analyze what is causing any ongoing problems?

Are all members of management and workers dedicated to safety at work?

The above questions are just the beginning of trying to solve the problem of reducing back injuries in hospitals and nursing homes. It is very clear that there is not one particular method that is going to be effective in solving the entire

(Continued on page 21)

1990-1991 MASTER CALENDAR

November 1990

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NOVEMBER

- 1 DEADLINE—Nominations for APTA Board of Directors due to APTA
DEADLINE—Mary McMillian Scholarship Award recommendations due
DEADLINE—Receipt of Nominations for national office due to APTA
- 5 APTA Board of Directors Meeting
- 6 APTA Board of Directors Meeting
- 7 APTA Board of Directors Meeting
- 10 Mailing of *Orthopaedic Practice*—November Issue
- 15 Editorial materials due to Section Office for January 1991 issue of *Orthopaedic Practice*
- 19 JOSPT Mailing Date—December Issue
- 22 HOLIDAY—Thanksgiving Day

DECEMBER

- 1 DEADLINE—Recommendations for APTA Committees and Task Force due to APTA
- 19 JOSPT Mailing Date—January 1991 Issue
- 25 HOLIDAY—Christmas Day

JANUARY

- 1 HOLIDAY—New Years Day
- 4 Mailing of *Orthopaedic Practice*—January 1991 Issue
- 7 DEADLINE—Nominations for Minority Scholarship due to APTA
- 18 JOSPT Mailing Date—February Issue
- 31 Combined Sections Meeting, Orlando, Florida
Multisection Programming on Documentation 8-12 Noon
Roundtables—Industrial Physical Therapy & Foot and Ankle 1-4 PM
Orthopaedic/Sports Section's Joint Meeting 4-5 PM

FEBRUARY

- 1 Eugene Michael's Forum 8-11 AM
Eugene Michael's Forum Continued 1:30-4:30 PM
- 2 New Wave—Electrotherapy for PTA's 8-9 AM
Business Meeting 9-11 AM
Roundtable—Head and Neck 1:30-3:30 PM
Research Presentations 3:30-5:30 PM
- 3 Roundtable—Manual Therapy 8-10 AM
Post Executive Committee Meeting 10 AM-12 Noon
Research Presentations Continued 12 Noon-2 PM

May 1991

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September 1991

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October 1991

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SECTION NEWS

PROGRAM CHAIR

The August Review of Orthopaedic Competencies course was attended by 82 therapists. These course participants experienced 7 days of comprehensive lectures covering anatomical and biomechanical review of regional structures and evaluation and varied treatment techniques. In addition to review sessions, therapists found time to enjoy the sun and surf at the Indian River Plantation Resort in Florida.

Next year the course will be presented only once so mark your calendar for the third week in September, 1991. The Section Executive Committee will be meeting in October and will finalize course schedule revisions. The course will be held in San Diego, California.

Since members have requested an annual Orthopaedic Meeting the Executive Committee will determine the feasibility of holding these meetings in conjunction with the Review Course in September.

CSM in Orlando is quickly approaching. Once again several sections have coordinated presentations to maintain a high level of seminars while minimizing time conflicts. Mark your calendars for the following events!

Your attendance at all CSM Orthopaedic Section functions is strongly encouraged. These events are planned to maximize your clinical performance. I personally invite you to attend the **Business Meeting** on Saturday to participate actively in the operation of the Section and more specifically, to give the Education Program Committee feedback on its efforts to meet your needs and interests. A continental breakfast is planned to thank you for your support of the Section. See you in Orlando!



Annette Iglarsh, P.T., Ph.D.

THURSDAY, JANUARY 31, 1991

8:00 AM - 12 Noon

"Documentation: Requirements for Professional Accountability"
C. Magistro, P. Williams, B. Miller
Multisection Program

1:00 - 4:00 PM

"Orthopaedic Roundtables"
Industrial Physical Therapy
Topic to be announced
S. Isernhagen, J. Floberg Moderators
Joint Program with Private Practice
Foot and Ankle Physical Therapy
topic to be announced
G. Hunt, Moderator

FRIDAY, FEBRUARY 1, 1991

8:00 - 11:00 AM

"Eugene Michaels Forum: Tissue Mechanics"

1:30 - 5:00 PM

"Soft Tissue Injuries and Treatment"
A. Grodin, 1:30 - 3:00 PM
T. Malone, 3:30 - 5:00 PM
Joint Program with Research and Sports Sections

SATURDAY, FEBRUARY 2, 1991

8:00 - 9:00 AM

"A New Wave: Update on Electrotherapy for Physical Therapist Assistants"
Joint Program with Private practice and clinical
Electrophysiology Sections

9:00 - 11:00 AM

Business Meeting

1:30 - 3:30 PM

"Roundtable: Head and Neck Therapy"
Update on Head and Neck Physical Therapy
Organization of Roundtable
D. Eagleton, Moderator

3:30 - 5:30 PM

"Orthopaedic Research Presentations

7:00 - 11:00 PM

"Ice Cream Extravaganza to benefit The Foundation for Physical Therapy"
Joint Social Event with Research Section

SUNDAY, FEBRUARY 3, 1991

8:00 - 10:00 AM

"Roundtable: Manual Therapy"
Update on Manual Therapy Techniques
Organization of the Roundtable
S. Paris, Moderator

10:00 AM - 12 Noon

"Orthopaedic Research Presentations Continued"

SPECIAL INTEREST GROUP IN INDUSTRIAL PHYSICAL THERAPY FEBRUARY 1990, NEW ORLEANS

The group was called together by Annette Iglarsh who discussed the Orthopaedic Section's interest in fostering a special interest group for industrial physical therapy.

The two-hour round table discussion was then chaired by Susan Isernhagen. In the first hour there was a presentation on the history and progress of industrial physical therapy. The second hour was a discussion of the role of physical therapy in industrial medicine and the programs which physical therapists participate currently. The following were discussion points and/or recommendations from the group:

1. We need to have an overview of the worker's compensation systems in all states for reference for our members. This should include current laws, how they impact physical therapy, and discussion on possible future changes. There should also be a synopsis of the problems and positive aspects of worker's compensation laws for physical therapists.
2. We need operational definitions for:
 - a. industrial physical therapy
 - b. work hardening
 - c. functional capacity evaluation
 - d. pre employment screening
 - e. pre placement screening

- f. work conditioning
This would include:
 - g. process for referral for these programs
 - h. tests and measurements being done
 - i. length of treatment sessions
 - j. outcomes desired

3. We need references that are up-to-date on industrial physical therapy and industrial rehabilitation.

4. We need published information on reliability and validity of physical therapy programs. These must be done on a research basis with approval for publication by refereed journals.

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5. Physical therapists need a system by which we can set up communication networks with NIOSH, OSHA, worker's compensation and insurance companies, and vocational counselors.

6. We need to police our own industrial physical therapy programs before we are restricted from outside sources.

7. We should investigate our relationship to accrediting bodies, such as CARE. Perhaps this will require development of standard of practice for physical therapy within industrial medicine.

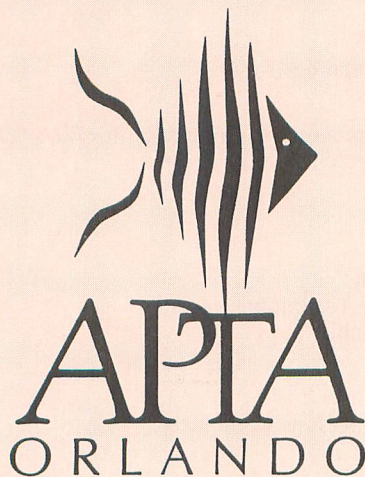
8. We need to look at the interdisciplinary nature of many of our programs. We need to develop relationships with other professions doing similar types of research or program development in our field. Ultimately we will need to work together with other professional organizations.

It was agreed that the Orthopaedic Newsletter would carry questionnaires to Orthopaedic Section Members regarding work hardening and pre employment screening. Jill Floberg volunteered to head-up the pre employment screening questionnaire and Susan Isernhagen volunteered to head the work hardening questionnaire development.

During the year, there will be an ability to respond to the questionnaires by Orthopaedic Section Members. The Orthopaedic Section Representative will collate the information received from the questionnaires and be ready to present it at the Combined Section Meeting in 1991.

There may be a brief meeting of the committee at the APTA national meeting in Anaheim, otherwise, the next formal get-together will be another formal discussion with the Orthopaedic Section sponsorship in February 1991.

Susan J. Isernhagen, P.T.



*We encourage you to attend the
Orthopaedic Roundtable
on
Industrial Physical Therapy
at CSM in Orlando.*

WORK HARDENING/WORK CONDITIONING QUESTIONNAIRE

1. Name of practice (optional): _____
2. State in which practice is located: _____
3. Disciplines used in your practice:
 - _____ PT
 - _____ OT
 - _____ Psychology
 - _____ Vocational Counseling
 - _____ Physician
 - _____ Other
4. How many hours a day is your average work hardening client in your clinic? (Circle the average number)
2 4 6 8
5. How many days per week is your work hardening/work conditioning program? _____
6. What is the average length of your program in weeks? (Circle average weeks)
4 5 6 7 8
7. Percent of the day your clients spend in each segment of work hardening: (Should add up to 100%)
 - _____ Work Simulation
 - _____ Muscle Endurance and Strength Exercise
 - _____ Aerobic Training
 - _____ Education
8. Average charge in your state for:
 - A. Four-hour day (Circle the average amount)
\$70 \$80 \$90 \$100 \$110 \$120 \$130 \$140
 - B. Average charge in your state for an all-day program
\$100 \$120 \$140 \$160 \$180 \$200 \$220 \$240 \$260 \$280 \$300
9. Have you done quality assurance programs regarding outcomes?
_____ Yes _____ No

Briefly comment on outcomes: _____

PLEASE RETURN QUESTIONNAIRE TO:
Susan J. Isernhagen, P.T.
Orthopaedic Section, APTA
505 King Street, Suite 103
La Crosse, WI 54601

ORTHOPAEDIC ITEMS

Public Relations and Audiovisual Materials

The items listed below are available for sale/rent through the Orthopaedic Section office:

- _____ Orthopaedic Physical Therapy logo pins. (Section Members \$10.00, non-Section members \$20.00)
- _____ Coffee mugs. \$5.50 each or \$20 per set of four (mugs can be sold in two of each style). Two styles: (indicate which style, "X")
 - _____ 1) Orthopaedic Physical Therapy definition, or
 - _____ 2) . . . the touch of class.(non-Section members \$8.00 each or \$30 for a set of four)
- _____ Brass paper weight of Section logo. (Section members \$25 each, non-Section members \$40).
- _____ Tape measure with the Section logo (six foot cloth tape), (Section members \$4, non-Section members \$6) (\$3.75 each in quantities of ten (10) or more, for Section members only)
- _____ Orthopaedic Physical Therapy brochures (Section members \$20 per 100 brochures, non-Section members \$35 per 100 brochures)
- _____ Orthopaedic Physical Therapy Terminology booklets (Section members \$2 each, non-Section members \$4) (\$1.75 each for orders of 20 or more, for Section members only)
- _____ Orthopaedic Physical Therapy competencies. (\$45 Section members, \$65 Educational Institutions, \$95 non-Section members)
- _____ Orthopaedic Section, APTA, Inc. membership certificate. This attractive, personalized certificate is now available. The cost is \$10 for the certificate. Subsequent yearly update stickers will be available at a cost of \$2 each. (Not available to non-Section members.) Please **print** below exactly how you would like your name and degree to appear.
- _____ Prints of *Bulletin* covers (9 $\frac{3}{4}$ " x 10") Section members \$15 each or \$100 for the set of nine. (non-Section members \$25 each or \$150 for the set of nine)
- _____ Display booths (\$50.00 per use plus return shipping). The Section has recently purchased two new, easy to use, table-top model booths.
- _____ Orthopaedic Physical Therapy Slide/Tape Program (Section members \$25.00 per use plus return shipping, purchase price \$120.00). Also available in $\frac{1}{2}$ " VHS video format. (non-Section members \$50 per use plus return shipping, not available for sale to non-Section members)
- _____ 10-Year Cumulative Index of *The Journal of Orthopaedic and Sports Physical Therapy*. (Section Members \$2.50, non-Section Members \$5.00)
- _____ Body Stamps set of three (1 front, 1 back, 1 right and left profile). (Section Members \$25.00, non-Section members \$30.00)
- _____ Musculo-Skeletal Examination and Recording Guide by Geoffrey D. Maitland (Section Members \$8.00, non-Section members \$12.00)

Name _____
(PLEASE INCLUDE ORTHOPAEDIC SECTION MEMBER'S NAME)

Address _____

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Please add \$2.50 per order for postage and handling

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La Crosse, WI 54601
608/784-0910, FAX 608/784-3350, 800-326-9056

Signature _____

VISA/MasterCard (circle one) # _____ Exp. Date _____

(note: minimum charge order \$20) APTA # _____

(Contact the Section office for further details) (9/89)

POST GRADUATE PROGRAMS

ORTHOPAEDIC PHYSICAL THERAPY

- | Name of School/Program | Contact |
|--|---|
| 1. Northwestern University | Judith Falconer, Ph.D.
Director of Graduate Studies
Northwestern University Medical School
Programs in Physical Therapy
345 East Superior Street, Room 1323
Chicago, Illinois 60611
Phone: (312) 649-8160 |
| 2. MGH Institute of Health Professions | Alan Jette, Ph.D., Program Director
Daniel Dyrek, M.S., Orthopaedic
Specialization Coordinator
15 River Street
Boston, Massachusetts 02108-3402
Phone: (617) 726-8000 |
| 3. Emory University | Dr. Pamela A. Catlin, Director
Division of Physical Therapy
Emory University School of Medicine
2040 Ridgewood Drive, NE
Atlanta, Georgia 30322 |
| 4. Northeastern University | Jane Toot, Ph.D., P.T.
Northeastern University
Department of Physical Therapy
360 Huntington Avenue
Boston, Massachusetts 02115 |
| 5. University of Pittsburgh | Karen S. Maloney, M.S., P.T.
Physical Therapy Department
University of Pittsburgh
101 Pennsylvania Hall
Pittsburgh, PA 15261
Phone: (412) 624-8938 |
| 6. University of Kentucky | Dean P. Currier, Ph.D.
Department of Physical Therapy, HP 500
University of Kentucky Medical Center
Lexington, Kentucky 40536
Phone: (606) 233-5941 |
| 7. University of Minnesota | Louis R. Amundsen
Course in Physical Therapy
Box 388, Mayo Building
University of Minnesota Health Sciences
Minneapolis, Minnesota 54555
Phone: (612) 376-4680 |
| 8. Kaiser-Permanente Medical Center | Orthopaedic Physical Therapy Program
and Clinical Residency
Kaiser-Permanente Medical Center
27400 Hesperian Boulevard
Hayward, California 94545
Phone: (415) 784-5092 |
| 9. University of Southern California | Lucinda Baker, Ph.D., P.T.
Acting Chair
Department of Physical Therapy
University of Southern California
2025 Zonal Avenue, CSA 249
Los Angeles, California 90033
Phone: (213) 224-7967 |
| 10. Medical College of Virginia | Virginia Commonwealth University
Department of Physical Therapy
P.O. Box 224
MCV Station
Richmond, Virginia 23298
Phone: (804) 786-0234 |
| 11. Georgia State University | Carolynn Crutchfield, Ed.D., P.T.
Director of Graduate Studies
Department of Physical Therapy
Georgia State University
Atlanta, Georgia 30303
Phone: (404) 658-3075 |
| 12. Washington University | Marybeth Brown, Ph.D.
Washington University Medical Center
P. O. Box 8083
660 South Euclid Avenue
St. Louis, Missouri 63110
Phone: (314) 362-3670 |
| 13. Temple University | Katherine F. Shepard, Ph.D.
Director of Graduate Studies
Department of Physical Therapy
3307 North Broad Street
Philadelphia, Pennsylvania 19140 |
| 14. Long Island University | Lydia Wingate, Ph.D., Director
Division of Physical Therapy
Long Island University
Brooklyn Campus
University Plaza
Brooklyn, New York 11201
Phone: (718) 403-1063 |
| 15. University of Alabama at Birmingham | Marilyn R. Gossman, P.T., Ph.D.
Director
Division of Physical Therapy
University of Alabama at Birmingham
1714—9th Avenue South
Birmingham, Alabama 35294
Phone: (205) 934-3566 |
| 16. Hahnemann University | Neil Pratt, Ph.D., P.T.
Curriculum Coordinator of Orthopaedics
Program in Physical Therapy
Hahnemann University
Mail Stop 502
201 North 15th Street
Philadelphia, PA (215) 448-1750 |

POST GRADUATE PROGRAMS continued

17. **University of Indianapolis** Ann Clawson, M.S., PT.
Coordinator, M.H.S. Program
University of Indianapolis
1400 E. Hanna Avenue
Indianapolis, IN 46227
Phone: (317) 788-3500
 18. **Quinnipiac College** Russell Woodman, Associate Professor
Department of Physical Therapy
School of Allied Health
and Natural Sciences
Quinnipiac College
Hamden, CT 06518
Phone (203) 288-5251 (Ext. 264)
 19. **Boston University** Catherine M. Certo, Sc.D., PT.
Chairperson
Department of Physical Therapy
Sargent College of Allied Health Sciences
Boston University
One University Road
Boston, MA 02215
Phone: (617) 353-2720
 20. **Institute of Graduate
Physical Therapy** Stanley V. Paris, Ph.D., PT.
Professor and Chairman
Institute of Graduate Physical Therapy
1240 Johnsons Ferry Place, Suite C-5
Marietta, GA 30068
Phone: (404) 977-7642
 21. **Kaiser Permanente—
Los Angeles** Julie Patterson, M.P.H., PT.
Kaiser Permanente—Los Angeles
Orthopaedic Physical Therapy
Residency Program
6041 Cadillac Avenue
Los Angeles, CA 90034
(213) 857-2458
-

THERE IS NO MAGIC ANSWER...

(Continued from page 18)

problem. The combination of ergonomic analysis, pre work screening to match a potential employee to the work and targeted injury prevention, are critical. These three can work together to reduce work injury, but ONLY if there are underlying safe work practices.

SUMMARY

Therefore, the triad of effective prevention is one of integration, cooperation, and dedication to the use of the three components. Any thorough program will address all three components before being brought forward as an injury reduction strategy.

The baseline of safe work practices is the responsibility of the employer. Consultants may assist in defining these, but it is the employer who is responsible for providing safe work guidelines. After that, an appropriately screened and educated worker must take the remaining responsibility to protect their own health over the time of their work.

In summary, injury prevention components cannot and do not stand alone. We must find a common ground to blend:

- **Ergonomic analysis**
- **Pre work screening**
- **Injury Prevention education**

The payoff will be a safer, more cost-effective, and more productive work site. Worker's compensation systems, insurance companies, health professionals, employers and employees alike, can work together to bring about this triad of prevention. It is the next generation of our advancement in work injury management.

This article also appeared in the Summer 1990 issue of *Industrial Rehab Quarterly*.

American Physical Therapy Association

1991 Combined Sections Meeting
January 31 - February 3



APTA
ORLANDO

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*Look for more information
in the next issue of
Orthopaedic Practice.*